

## **Occupational and educational biographies of older workers and their participation in further education in Germany<sup>1</sup>**

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*The adult cohort of the German National Educational Panel Study (NEPS) provides data from six sets of longitudinal data derived from 11,932 German adults. We used the NEPS data to look at the effects of formal education in adulthood and occupational changes on participation in further vocational education and training in order to gain a better understanding of learning activities of older workers. This data enables us to differentiate between upward mobility, downwards mobility and changes at the same level of occupation. In a multi-regression-analysis we control for well-documented predictors – such as level of schooling and vocational education, job status, gender and age as well as for company size. Descriptive results confirm the expected effects, but these effects disappear when the other variables are taken into account.*

**Keywords:** *educational pathways, job changes, transitions, educational activities, gender.*

### **State of research**

The participation of older workers in lifelong learning is not only a policy issue but becomes more and more a central challenge for human resource development (HRD) experts. For adult educators a deeper understanding of structures and motives of older workers educational activities is essential to address this target group properly. The participation of older workers in learning activities can be seen as a meaningful topic for the future, given that the number of older adults and the proportion of older adults in the workforce is expected to increase further.

For a long time research into factors predicting adult education participation has been discussed on the basis of cross-sectional data such as coming from adult education surveys. As recent analysis of the PIAAC data show, vocational experiences, job requirements, and job changes seem to have had an impact on educational activities (Schmidt-Hertha & Rees, 2015; Tikkanen & Nissinen, 2015). With respect to the meaning of transitions in learning and education (Cross, 1981; Schmidt-Hertha, 2017) and the learning requirements associated with a new job or position, the impact of job changes on learning activities seems plausible. Nevertheless, cross-sectional data cannot be indicative of causalities. Whilst longitudinal data have already been applied to learn more about the effects and benefits of adult education, they have been applied less for predicting participation (Schuller, Preston, Hammond, Brasset-Grundy & Bynner, 2004).

Against the background of demographic changes and a rapidly increasing percentage of 'elderly' amongst staff, the low rate of participation in vocational further education amongst older workers has become the subject of debates in science, politics, and business. While political programs aim at increasing participation in further education among older workers (e.g. WeGebAU – a German initiative for encouraging further education for lower-skilled and underemployed staff), human resource (HR) managers lament the lack of willingness among older members of staff to learn or to participate in education (Schmidt, 2011). Scientific studies, however, show that, on the one hand, individual returns from vocational further education depend on age and on average decrease with age (e.g. regarding job security, promotion, or higher income (Lang, 2012; Beicht, Krekel & Walden, 2006)). On the

other hand, there are clear indications that a stronger differentiation among older workers is necessary and that other influencing factors are of relevance that superimpose themselves on age (such as educational qualifications (Thieme, Brusch & Büsch, 2015; Schmidt, 2007)), just as deficits in the offering structures seem to be a cause for age differences in participation in further education (Zwick, 2011; 2012). In summary, many findings suggest that it is not so much biological age, but rather the job situation and the overall living conditions that function as primary predictors for participation in further education (Schmidt, 2009; Schmidt-Hertha & Rees, 2015). Against this background, the question arises as to how far participation in further education among older workers is also determined by the learning requirements with which they are confronted in the workplace or by their experiences in the course of their educational and vocational biography.

One of the best substantiated empirical findings in research on further education is the so-called 'Matthew effect', that is the strong correlation between participation in further education and formal education (Bilger, Gnabs, Hartmann & Kuper, 2013). A distinctly greater probability of participation in further education among individuals with higher general educational and vocational qualifications is evident for diverse subgroups – including older workers (Büchel & Pannenberg, 2004; Schmidt, 2009). Until now, however, formal qualifications were only differentiated according to quality and not taking account on the point in time at which they were acquired. Thus, it is still unclear about the extent to which the use of opportunities offered by second- and third-chance education (pathways to higher education for adults with no or only a low level of formal education) is successful and of significance to older adult's future willingness to partake in further education. Qualitative data on older workers are suggestive that such late educational experiences may be of special relevance to the future educational behavior (Schmidt, 2009).

With regard to workplace conditions, mental stress at the workplace, the required level of performance in completing work tasks (Thieme, Brusch & Büsch, 2015), as well as the qualifications required by the job (Schmidt-Hertha and Rees, 2015; Tikkanen/Nissinen, 2015) have proved to be significant predictors of participation in further education amongst older workers. Furthermore, company size (Schmidt, 2009), sector (Cordes & Haaren, 2015), and the company's age structure and

qualification structure (Bellmann, Dummett & Leber, 2013) are relevant factors influencing participation in vocational further education. As yet, very little research has been carried out regarding the impact of a change of job or of employer on participation in vocational further education. On the one hand, it can be assumed that a change in job will be accompanied by additional learning requirements and thus by more incentives for participating in further education activities. On the other hand, such career changes can be of varying quality (for example involving promotion versus change on the same level, one-time versus frequent change of workplace) and accordingly may be perceived by the parties concerned as more or less significant and of higher or lower relevance to learning. Nevertheless educational processes can help prepare and even enable career changes, which is why the chronological sequence of participation in further education and career changes is of special significance in interpreting the interrelations of these factors.

On the basis of data from the cohort of adults studied by the National Educational Panel (NEPS), the effects of career changes on participation in further education can be investigated longitudinally, because the survey has already systematically covered not only educational activities, but also career episodes over a period of more than eight years.

Central research questions of this paper are related to the meaning of educational and occupational transitions for participation in vocational further education. Does formal education as a second- or third-chance education in adulthood effect current educational behavior? Do occupational changes (changing job and/or employer) have an influence on participation in vocational further education?

### **The National Educational Panel Study**

The National Educational Panel Study (NEPS) investigates educational processes and competence development from early childhood up to late adulthood throughout Germany. NEPS started in 2009 as a temporary research project at the Otto Friedrich University Bamberg, funded by the Federal Ministry of Education and Research, and was integrated into the newly founded Leibniz Institute for Educational Trajectories (LIfBi) in 2014, thus consolidating it. A central aspect of the investigation of educational processes in the National Educational Panel Study is the differentiation of five comprehensive analytic dimensions, the so-called 'pillars':

Pillar 1: Competence development across the life course

Pillar 2: Education processes in life-course-specific learning environments

Pillar 3: Social inequality and educational decisions across the life course

Pillar 4: Education acquisition of persons with migration background

Pillar 5: Returns to education across the life course.

These content-related pillars are integrated across the lifespan, which is divided into eight educational phases by the National Educational Panel:

Phase 1: Newborns and early childhood education

Phase 2: From kindergarten to elementary school

Phase 3: From elementary school to lower secondary school

Phase 4: From lower to upper secondary school

Phase 5: Upper Gymnasium (secondary) level and transition to higher education, vocational training or the labour market

Phase 6: From vocational training to the labour market

Phase 7: From higher education to the labour market

Phase 8: Adult education and lifelong learning.

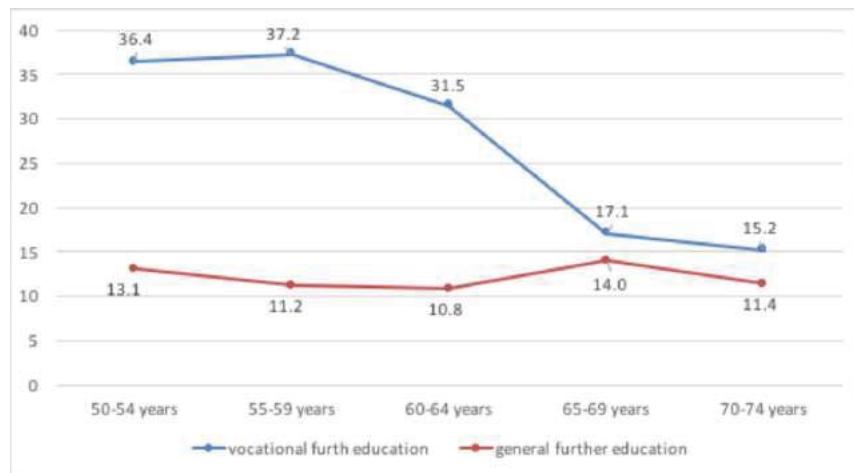
In a multi-cohort sequence design more than 60,000 target persons and 40,000 context persons (e.g. parents, teachers) were included from six starting cohorts ranging from early childhood to adulthood, all of whom were selected and first interviewed in the years 2009 to 2012. The cohort of adults (starting from cohort 6) is composed of adults being interviewed for the first time as well as adults being interviewed repeatedly, because some of the individuals interviewed in the precursor study 'Working and learning in change' (ALWA) carried out in 2007/2008 were transferred to the first wave of the

NEPS. The population of this starting cohort 6 consists of adults aged between 23 and 64 years (at the time of the first interview), living in private households in Germany, who have mostly finished their initial training. The NEPS is designed as a panel according to which each of the target persons are contacted about every 12 months and asked for a repeat interview. Every second survey year, competence assessments are planned which are carried out via oral computer-assisted personal interviews (CAPI). In waves without competence assessments, interviews via telephone (CATI) were preferred whenever possible. All of the interviews were computer-assisted (Bäumer *et al.*, 2012; Blossfeld, Rossbach & von Maurice, 2011).

### **Data sets and methods**

The following analyses are based on the fifth wave of starting cohort 6, comprising adults interviewed in 2012/13 in the course of the National Educational Panel Study (NEPS). The current sample comprised 11,696 individuals born between 1944 and 1986. Since in the following analyses, we only include older employed adults (50+ years), the sample was reduced to 5,208 individuals. Participation in further education by these individuals implies that they participated in at least one class or course of studies during the past twelve months, with the focus on non-formal further education in particular. Non-formal further education is here defined as all forms on vocational and non-vocational further education which are organized as courses, e-learnings or lectures but do not lead to diplomas which are recognized by the state. Further education is differentiated according to the reasons given for participating that is for either work-related and/or private interests. This line of inquiry, however, was only carried out for two of the courses the interviewees attended, at most, so that data on differentiated further education participation among the interviewees are limited. Participation in further education among adults older than 50 years for work-related reasons amounts to 27.9 per cent, 6.3 per cent participated for private reasons, and 5.3 per cent for private and work-related reasons. The latter cohort will in the following be associated with vocational and general further education. Figure 1 shows participation by employed individuals in vocational and general further education according to age group.

**Figure 1: Participation of employed individuals in vocational and general further education in percent according to age**



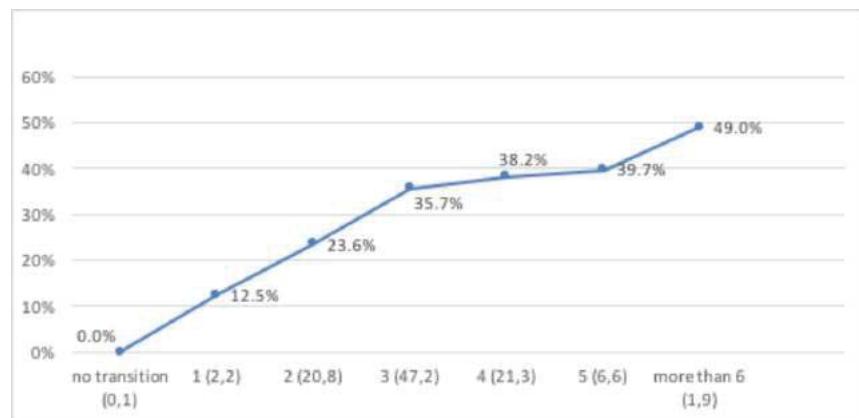
The analysis was undertaken through logistic regression (Backhaus, Erichson, Plinke & Weiber, 2011), with participation in vocational further education being the variable to be explained. In addition to the education and employment biography variables that need to be investigated, the predictors included gender, age, socio-economic status (via International Socio-Economic Index (ISEI)), level of education measured by the last achieved ISCED (International Standard Classification of Education) level, as well as company size, all of which contribute significantly to the explained variation.

### **The impact of educational biography on current education behavior<sup>2</sup>**

A variable presenting the number of educational transitions in the level of formal education is of crucial significance for our research question. Date related to these changes has been collected in the first wave retrospectively, when people have been asked to report formal education activities. We aggregated the data on formal education during the life course to one variable representing the number of changes in levels of education (based on CASMIN and/or ISCED classification). The first change usually represents the first school certificate while the second change in most cases represents the first vocational training or higher

education certificate. If there are three or more changes documented, we start from the assumption that this stands for second or third chance education. This indicator in the following is called 'number of educational transitions'.

**Figure 2:** Participation in vocational further education among workers according to the number of educational transitions



The descriptive analyses of the number of transitions initially confirms the assumption that formal qualifications that were acquired at a later point in time might have a positive impact on willingness to participate in further education. At the same time they point to the erosion of the normal course of life in which such transitions are only to be expected twice, that is after the first general qualification and after vocational qualification (see Figure 2).

The results of the logistic regression model on participation in vocational further education among workers older than 50 are documented in Table 1. The influence of the variable 'number of educational transitions' as well as that of the predictors shown to be of empirical relevance are shown as odds ratio (effect coefficient  $\text{Exp}(B)$ ). This value specifies the prospect of participating in further education in relation to the reference category. In view of the subject of investigation and the complexity of the data set, a pseudo- $R^2$ -value of 0.115 points to a respectable explained variation. However the interrelations expected

were only partially confirmed. Although the explanatory contribution by higher formal qualifications obtained after completing school or initial vocational training (recorded here via changes in the achieved ISCED and/or CASMIN (Comparative Analysis of Social Mobility in Industrial Nations) level) is not statistically significant, it still proves important as a control variable in so far as the weights of the other variables taken into account by the model are shifted. Rather conspicuous are the considerable gender-related differences, which seem to come even more to the fore once other variables are controlled for. Whereas, from a purely descriptive point of view, participation in further education among female and male workers hardly differs (Leven, Bilger, Strauß & Hartmann, 2013), female workers older than 50 can be shown to be much more active regarding further education than male workers of the same age group once social status, educational background, company size, and formal educational activities during adulthood are controlled for. Thus, the women in that older age group have a 1.5 times higher chance of participating in vocational further education than the men in that group. Also conspicuous is the fact that, although company size does not prove to be of significance as a linear predictor, it noticeably increases the proportion of explained variance of the complete model.

**Table 1:** Logistic regression of the number of educational transitions taking into account other predictors regarding participation in vocational further education

|                                   | B      | Standard error | Wald   | Sig.   | Exp(B) |
|-----------------------------------|--------|----------------|--------|--------|--------|
| Age                               | -0.060 | 0.017          | 12.165 | .000** | 0.941  |
| ISEI-08                           | 0.010  | 0.005          | 4.520  | .033*  | 1.010  |
| Size of company                   | 0.060  | 0.032          | 3.502  | .061   | 1.062  |
| Number of educational transitions | 0.073  | 0.111          | 0.437  | .509   | 1.076  |
| Gender (RC: men)                  | 0.436  | 0.187          | 5.461  | .019*  | 1.547  |
| ISCED                             | 0.101  | 0.044          | 5.240  | .022*  | 1.106  |

Pseudo-R<sup>2</sup>: ,115; \*p<0,05; \*\*p<0,01

### **The impact of occupational biography on education behavior**

The impact of occupational biography on workers' participation in vocational further education was also investigated. Particular focus is placed on the effects on changes in the workplace over the life course. With regard to the significance of transitions for education and learning (in this context, see Cross, 1981) and to the requirements regarding learning that accompany a change to a new workplace or a new position, the impact of occupational change on learning seems plausible. On the one hand, the number of occupational transitions can be taken into account; on the other hand, the type of change can be looked at. Participation in vocational further education in relation to the number of occupational transitions over the life course (ranging from zero to more than nine transitions) hardly differs from that observed in relation to the number of educational transitions (see Table 2). The expected effect of occupational changes on activities in vocational further education cannot be verified in the descriptive analysis.

**Table 2: Workers' participation in vocational further education in relation to the number of occupational transitions**

| Number of occupational changes | Proportion of sample (%) | Participation in vocational further education and training (%) |
|--------------------------------|--------------------------|--|
| 0                              | 5.3                      | 32.9   |
| 1                              | 13.3                     | 33.2   |
| 2                              | 15.4                     | 32.3   |
| 3                              | 17.1                     | 35.7   |
| 4                              | 14.5                     | 33.2   |
| 5                              | 10.7                     | 37.3   |
| 6                              | 8.0                      | 33.0   |
| 7                              | 5.3                      | 36.2   |
| 8                              | 3.7                      | 31.3   |
| 9                              | 2.2                      | 34.5   |
| >9                             | 4.3                      | 25.2   |

As for the quality of occupational transitions, the groups are differentiated according to 'no transition', 'transition on the same level', 'transition to a lower level', and 'transition to a higher level'. This differentiation was undertaken on the basis of the respective ISEI level of the initial employment and of the current employment. In this case, too, we are dealing with a retrospective description. During the initial and the current employment other changes in the ISEI-08 may occur that are not taken into consideration here.

**Table 3: Workers' participation in vocational further education in relation to the quality of the occupational transition**

|                              | Proportion of sample (%) | Participation rate (%) |
|------------------------------|--------------------------|------------------------|
| No occupational transition   | 5.6                      | 32.5                   |
| Transition to the same level | 21.5                     | 39.8                   |
| Transition to a lower level  | 30.0                     | 27.0                   |
| Transition to a higher level | 42.9                     | 36.8                   |

On the one hand, the descriptive analyses show that a minority of workers remain in one and the same workplace over their life course; rather, their occupational biography includes several occupational transitions. This is also made clear by the number of changes in jobs, with most of the interviewees reporting three occupational transitions (Table 2). However, data don't provide any information on whether these transitions have been self-initiated or imposed. With regard to the quality of the occupational transitions, the largest group is that which shows a higher ISEI value than the one they had at the time of their first employment after having reached the age of 50 (see Table 3). On the other hand, those groups featuring transitions to the same or higher level show a more pronounced willingness to participate in further education than those groups with no transitions or transitions to a lower level. Thus, in this context, the descriptive results confirm the assumption that transitions in occupational biographies, especially those accompanied by higher learning requirements (transitions at the same or to a higher level), have a positive impact on participation in further education.

**Table 4:** *Logistic regression of the quality of occupational transitions  
with regard to participation in vocational further education*

|  | B      | Standard error | Wald   | Sig.   | Exp(B) |
|--|--------|----------------|--------|--------|--------|
| Occupational transition<br>(RC: no transition) |        |                |        |        |        |
| Transition to the same level                   | 0.293  | 0.150          | 3.846  | .050   | 1.341  |
| Transition to lower level                      | -0.247 | 0.148          | 2.801  | .094   | 0.050* |
| Transition to higher level                     | 0.204  | 0.143          | 2.046  | .153   | 1.226  |
| Age  | -0.043 | 0.006          | 44.381 | 000**  | 0.958  |
| Gender (RC: men)                               | 0.216  | 0.064          | 11.426 | .001** | 1.241  |

Pseudo-R<sup>2</sup> = .034 \*p<0,05; \*\*p<0,01

With a pseudo-R<sup>2</sup> value of .034, the explained variance is rather moderate in this context. The occupational transitions over the life course prove to be of significance to participation in further education for only one group. Compared to the group of older workers who stayed in the same workplace throughout their life course, older workers who changed workplaces and whose current employment is of the same status as their first employment have a 1.3 times higher prospect of participating in vocational and further education, even if gender and age are controlled for (see Table 4). Only once the other predictors – educational background, social status, and company size – are controlled for as well, occupational transitions are no longer significant (see Table 5). However, in this case too, a shift in the variables taken into account emphasizes the significance of occupational transitions as a control variable.

**Table 5: Logistic regression of the quality of occupational transitions taking into account other predictors regarding participation in vocational further education**

|   | B      | Standard error | Wald   | Sig.   | Exp(B) |
|---|--------|----------------|--------|--------|--------|
| Occupational transition (RC: no transition) |        |                |        |        |        |
| Transition to lower level                   | -0.035 | 0.294          | 0.014  | .904   | 0.965  |
| Transition to higher level                  | 0.092  | 0.283          | 0.106  | .744   | 1.097  |
| Age   | -0.057 | 0.018          | 10.588 | .001** | 0.944  |
| Gender (RC: men)                            | 0.449  | 0.191          | 5.553  | .018*  | 1.568  |
| ISCED                                       | 0.110  | 0.044          | 6.395  | .011*  | 1.117  |
| ISEI-08                                     | 0.010  | 0.006          | 3.044  | .081   | 1.010  |
| Size of company                             | 0.062  | 0.033          | 3.615  | .057   | 1.064  |

Pseudo-R<sup>2</sup> = .112 \*p<0,05; \*\*p<0,01

## Discussion

The findings do not confirm the expected relevance of changes in the level of formal education and occupational transitions for further education activities amongst older workers. Schmidt (2009) suggests that the successful organization and tackling of biographical upheavals through educational activities – including at later stages in life – entails a high degree of openness regarding offers of further education. As far as the NEPS data are concerned, this effect is initially reflected only on the descriptive level, but appears to be explained above all by other socio-demographic factors. Although the underlying attitudinal patterns and motives for participating in further education cannot be taken into account here, the operationalization of formal educational as well as occupational transitions in the course of adulthood carried out in the investigation at least showed the differences revealed on a bivariate basis to be spurious effects. However, the data indicate that experiences with formal education and occupational transitions interact with other variables; the importance of this finding would have to be ascertained through further analyses. The fact that attitudes towards

learning and education may still change, even in late adulthood, justifies carrying out further studies focusing more closely on the impact of second- and third-chance education on further education behavior. Special emphasis should be placed on examining the chronology of further education activities and occupational transitions throughout the occupational career. The short-term effects of occupational changes on further education behaviour are also the main focus of a current study on further education behaviour among older workers (Schmidt-Hertha, Rees & Kuwan, 2015).

The findings are also of relevance to an investigation of further education behavior among older workers insofar as they show that, even when taking into account other predictors, age in itself provides an independent explanation for participation in further education. According to the present data, biographical age still affects participation in further education, even if educational background, educational biography, and socio-economic status are taken into consideration. This is consistent with a picture frequently conveyed by descriptive statistics, namely that participation in further education decreases after the age of 50. At the same time, the results of the study are in contrast with those of other studies warning against an overestimation of biographical age and pointing to the importance of experiences accumulated in the course of the educational and occupational biography and of the current job situation (Aust & Schröder, 2006; Schmidt, 2007). Against this background, it can be assumed that the relation between age and participation in education will be even further relativized once additional variables on the current job situation and on requirements at the workplace are taken into consideration, as is possible on the basis of the PIAAC data (Schmidt-Hertha & Rees, 2015).

Finally, the distinct effect of gender raises questions that need to be investigated in further studies and through other data. As yet no explanation has been given as to why, if all the above mentioned factors are controlled for, the probability of participation in further education is far higher for older female workers than it is for male workers of the same age.

### **Conclusion**

Theoretical models clearly indicate a relevant impact of life transitions on adult education activities (Cross, 1981), and there is also some evidence for that (Tikkanen & Nissinen, 2015; Schmidt, 2009). The paper has been

looking at two forms of transitions in adulthood: educational transitions (here defined as changes in educational levels, consequently related to formal education) and occupational changes (operationalized as changing the job and/or the employer). For both kinds of transitions no significant effect could be found on participation in vocational further education of older workers. One central reason for that might be that we did not control for the timing of these transitions and thus transitions – whether educational or occupational – are treated the same no matter if they had happened last year or decades ago.

Findings indicate the relevance of age and gender when it comes to participation in vocational further education. While the effect of age is also visible – or even might be overestimated – in descriptive statistics, gender effects only become visible if other variables are controlled for. There seem to be concurrent effects in particular for gender, occupational status, age, and socio-economic background. The results show that women in the same age and position and with the same socio-economic background are more likely to participate in vocational further education than men. However, women – in particular the cohorts we have been looking at – are disadvantaged on the labor market and consequently also economically disadvantaged in many ways. Thus, public statistics show a lower participation rate among women than among men, but this is due to these disadvantages and not to a lower interest in vocational further education.

### **Endnotes**

- 1 "This paper uses data from the National Educational Panel Study (NEPS): Starting Cohort Adults, HYPERLINK "<http://dx.doi.org/10.5157/NEPS:SC6:8.0.0>". From 2008 to 2013, NEPS data was collected as part of the Framework Program for the Promotion of Empirical Educational Research funded by the German Federal Ministry of Education and Research (BMBF). As of 2014, NEPS is carried out by the Leibniz Institute for Educational Trajectories (LIfBi) at the University of Bamberg in cooperation with a nationwide network."
- 2 Some of the following passages have been published in a journal: Schmidt-Hertha/Müller 2016

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